

REMARKS

The undersigned notes the Office Action mailed September 22, 2000, in connection with the above-identified application, considering claims directed to a semiconductor device. In order to have the claims directed to a photosensitive resin composition considered in the present application, applicants have submitted concurrently herewith a Continued Prosecution Application (CPA) Request Transmittal. Consistent therewith, in this Preliminary Amendment applicants have amended the title of the above-identified application to be "PHOTOSENSITIVE RESIN COMPOSITION", consistent with the claims to now be considered in the present application.

In addition, in this Preliminary Amendment, claims 1-9 and 15-19 (which were the claims, previously in the application, not directed to the photosensitive resin composition) have now been cancelled without prejudice or disclaimer.

In addition, claim 10 has been amended to recite a photosensitive resin composition for i-line stepper using monochromatic light. Note, for example, the paragraph bridging pages 4 and 5, as well as the first full paragraph on page 5, of applicants' specification.

Moreover, applicants are adding new claims 20-36 to the application. All of these newly added claims are directed to a photosensitive resin composition, and claims 25 and 31 are independent claims.

Claims 20 and 21, dependent respectively on claims 10 and 20, respectively recites that the composition further includes

an addition-polymerizable compound; and recites that this addition-polymerizable compound is tetraethylene glycol dimethacrylate. Claims 22 and 23, dependent respectively on claims 10 and 22, respectively recites that the polyimide precursor is formed from an oxydiphthalic acid or acid anhydride thereof with a diamine, and recites that the diamine is a diaminodiphenyl ether. Claim 24, also dependent on claim 22, defines specific diaminodiphenyl ethers, from which the diamine is selected.

Claim 25 defines a photosensitive resin composition which includes a polyimide precursor formed from an oxydiphthalic acid or acid anhydride thereof with a diamine, and which is adapted to be exposed and developed using an i-line stepper which uses monochromatic light. Claim 26, dependent on claim 25, recites that the composition further includes a polymerization initiator; and claims 27-30 expressly set forth subject matter recited in claims 20, 21 and 23, but are dependent respectively on claims 26, 27, 28 and 27.

Claim 31 defines a photosensitive resin composition for i-line stepper using monochromatic light, which comprises a polyimide precursor, formed from an oxydiphthalic acid or acid anhydride thereof with a diamine. Claims 32 and 33, dependent respectively on claims 31 and 32, respectively recites that the composition further comprises a polymerization initiator and recites that the composition further comprises an addition-polymerizable compound; and claim 34, dependent on claim 33, further defines the addition-polymerizable compound. Claims 35 and 36 expressly recite subject matter set forth in

claims 23 and 24, but are each dependent on claim 31.

The undersigned notes the references applied by the Examiner in the Office Action mailed September 22, 2000, in connection with the semiconductor device claims (that is, U.S. Patent No. 4,783,391 to Ohbayashi, et al. and U.S. Patent No. 5,399,460 to Aldrich, et al.). In connection with these two references, applicants respectfully submit herewith a Declaration Under 37 CFR 1.132 of M. Kaji, one of the joint inventors named in the above-identified application, which Declaration was submitted in connection with a prior application of the above-identified application, Serial No. 09/136,610, filed August 20, 1998, upon which priority is being claimed herein under 35 USC 120.

It is respectfully submitted that the enclosed Declaration, especially together with evidence in applicants' specification, shows that the photosensitive resin composition as presently claimed provides unexpectedly better results when utilized in connection with an i-line stepper using monochromatic light. As to the unexpectedly better results, attention is respectfully directed to Table 3 on page 26 of applicants' specification, together with the results shown in the enclosed Declaration of M. Kaji. As seen in the paragraph bridging pages 24 and 25 of applicants' specification, each of various solutions shown in Table 2 on page 23 of applicants' specification was coated on a silicon wafer to form a film having a thickness of 20 μ m, and the film was exposed by using an i-line stepper to a mask having patterns. Results are shown in Table 3. As can be seen, patterns formed according

to the present invention were good, while patterns formed utilizing compositions of Comparative Examples 1 and 2 were poor.

It is respectfully submitted that the enclosed Declaration directly compares samples of Ohbayashi, et al. and of Aldrich, et al., and samples according to the present invention. Note particularly the results shown in Tables 1-3 on pages 6-8 of the enclosed Declaration. As seen in these results, and as discussed on page 9 of the enclosed Declaration, under the conditions of Ohbayashi, et al., the sample of Ohbayashi, et al. shows good results; however, when the thickness of the sample is increased, to $20\mu\text{m}$, undercut occurs in the sample and good resolution cannot be obtained. Similarly with Aldrich, et al., exposure under conditions of Aldrich, et al. shows good results; however, when the thickness of these samples are increased, e.g., to $20\mu\text{m}$, undercut occurs in the samples and no good resolution can be obtained.

On the other hand, according to the present invention, good patterns with high resolution can be obtained with a wide range of compositions utilizing a polyimide precursor formed using oxydiphthalic acid or acid anhydride thereof, with a diamine, as shown in Table 2 of the Declaration.

It is respectfully submitted that the results of the enclosed Declaration, particularly with the results shown in the specification of the above-identified application, clearly show unexpectedly better results achieved utilizing the photosensitive resin composition of the present invention,

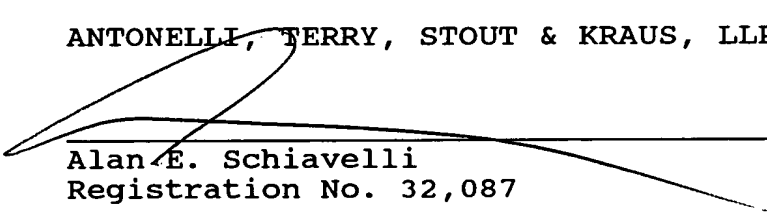
particularly where relatively thick films (of, for example, 20 μ m) are utilized, as compared with using compositions of Ohbayashi et al. and of Aldrich, et al., thereby establishing unexpectedly better results in comparison with these references and clearly establishing unobviousness of the present invention with respect to the teachings of these references.

In view of all of the foregoing, entry of the present amendments and of the enclosed Declaration, and continued examination of the above-identified application in due course, are respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (511.33114VV5), and please credit any excess fees to said deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP



Alan E. Schiavelli
Registration No. 32,087

AES/slk
(703) 312-6600